Component 1

Assessment and Monitoring

Managing the Child with Asthma:
Component 1 – Assessment and Monitoring

Children with asthma need to be monitored regularly.

Schedule appointments when the child is healthy.

- For the child whose asthma is under control, schedule at least 2 visits/year.
- The child using daily therapy may require at least 3 to 4 visits/year.
- The child with unstable asthma may require visits at least every 2 weeks until asthma is stable.

Review:

- Adherence with medication and control measures.
- Whether therapy needs increasing or decreasing.

In the office:

Ask about symptom patterns over the past 2 weeks.

- Nighttime (or early morning) symptoms
- Daytime symptoms (coughing, wheezing, shortness of breath or rapid breathing, chest tightness)
- School absences
- Limitations of daily activities
- Use of short-acting bronchodilators and other medications

For infants, ask about:

- Difficulty with feeding (grunting sounds, poor sucking)
- Changes in respiratory rate
- Altered sleep patterns
- Retractions (sucking in of the chest)
- Irritability, lethargy
- Decreased appetite, weight loss

For older children, ask about:

- Fatigue (slows down or stops playing, increased irritability)
- Complaints about “not feeling well”
- Avoidance of certain activities (e.g., sports, gym class, sleep-overs)
- Poor school performance

Periodically assess pulmonary function.

Spirometry is recommended:

- At the initial visit.
- After treatment is initiated, and symptoms and peak expiratory flow have stabilized, to document attainment of (near) "normal" airway function.
- At least once yearly to assess maintenance of airway function, regardless of medication (changes).
- To evaluate the response to a change in therapy.

Pulmonary Function Testing

Patient _____

Age _____ **Date** _____

Pre-Bronchodilator

Have the patient perform three maneuvers. Record the results of the maneuver with the greatest sum of FEV_1 and FVC below:

Time of Test: ____: ____ **AM** ___ **PM** ___

FEV_1	_____ L	____ %	} predicted normal
FVC	_____ L	____ %	
PEF	_____ L/sec	____ %	

Post-Bronchodilator

Test at least 15 minutes after the last inhalation of the bronchodilator. Have the patient perform three maneuvers. Record the results of the maneuver with the greatest sum of FEV_1 and FVC below:

Time of Test: ____: ____ **AM** ___ **PM** ___

FEV_1	_____ L	____ %	} predicted normal
FVC	_____ L	____ %	
PEF	_____ L/sec	____ %	

Reversibility

Calculate the reversibility of FEV_1 using the following formula:

$$\left[\frac{\text{Post - Pre}}{\text{Pre}}\right] \times 100 = \_\_\_\_\_ \%\ \text{Reversibility}$$

Where: Post = Post-bronchodilator FEV_1
Pre = Pre-bronchodilator FEV_1

At home:

Every child with asthma, and their parents and caregivers, should be taught to recognize symptom patterns that indicate adequate or inadequate asthma control and the need to add medication and/or contact the physician.

Measuring peak expiratory flow (PEF) with a peak flow meter can be helpful.

Teach the child, the parent, and caregivers:

- How to use the peak flow meter.
- How to interpret peak flow measurements and incorporate into treatment plan.

Children with moderate persistent or severe persistent asthma should have a peak flow meter at home and at school, if feasible.

Peak flow meters measure pulmonary airflow. When airflow is obstructed, peak flow meters measure the extent of obstruction. Use peak flow meters:

In the office:

- Before and 15 minutes after bronchodilator to determine if response is adequate.
- To evaluate response to changes in chronic maintenance therapy.
- Before and after a short (3- to 10-day) course of oral corticosteroids.
- For monitoring response to treatment of an exacerbation.

At home:

- When perceptions of symptoms are unreliable.
- To guide decisions about when treatment needs to be increased or decreased.
- During an exacerbation, before and 15 minutes after bronchodilator to determine if response is adequate.
- **To determine when to call the physician and/or seek emergency care.**
- To evaluate response to changes in chronic maintenance therapy.
- For 1 week before a regular office visit.
- Every morning and evening during and after a course of oral corticosteroids.

For long-term monitoring:

Monitoring is achieved by comparing daily PEF to the child's personal best PEF. Personal best is the highest peak flow number a child can achieve over a 2- to 3-week period when his or her asthma is under good control. Good control is when a child feels good and does not have any asthma symptoms. (A course of oral corticosteroids may be necessary to optimize asthma control and, thus, establish personal best.)

When determining personal best PEF:

- Always use the same peak flow meter.
- Record PEF 2 times/day for 2 weeks.
- Do not rely on one outlying value (occasionally a PEF value is markedly higher than others, perhaps due to coughing or "spitting" into the peak flow meter).
- Reassess periodically to account for progression of disease or for growth.

Who should do long-term PEF monitoring?

PEF monitoring may be useful for any child (generally over 5 years of age) with asthma, and his or her caregiver. It is particularly recommended for patients with:

- Poor symptom perception.
- Moderate-to-severe asthma.
- A history of severe exacerbations.

Long-term PEF monitoring can give caregivers and children with asthma more control over directing the course of the disease.

Two ways to use a peak flow meter for long-term monitoring:

- Use every morning when the child wakes up, and before the child uses any medication.
  ⇒ Compare to the child's personal best PEF.

OR

- Use in the morning AND in the late afternoon or evening.
  ⇒ The evening measurement may be done after the child uses a short-acting bronchodilator (if the child uses a short-acting bronchodilator).
  ⇒ A greater than 20% difference between the morning and evening measurements suggests inadequately controlled asthma.

Cutpoints for PEF Monitoring

- PEF ≤ 80% of the child's personal best before a short-acting bronchodilator indicates a need for additional medication.
- PEF ≤ 50% of the child's personal best indicates a severe asthma exacerbation.

Cutpoints should be tailored to the child's needs and PEF patterns. The emphasis is not on a specific PEF value but, rather, on changes from one reading to the next.

The Peak Flow Zone System

% Personal Best

> 80%

Green Zone: Good control!

- No asthma symptoms.
- Take medications as usual.

50%-80%

Yellow Zone: Caution!

- Use a short-acting inhaled $beta_2$-agonist.
- Check about changing medications or increasing dose.

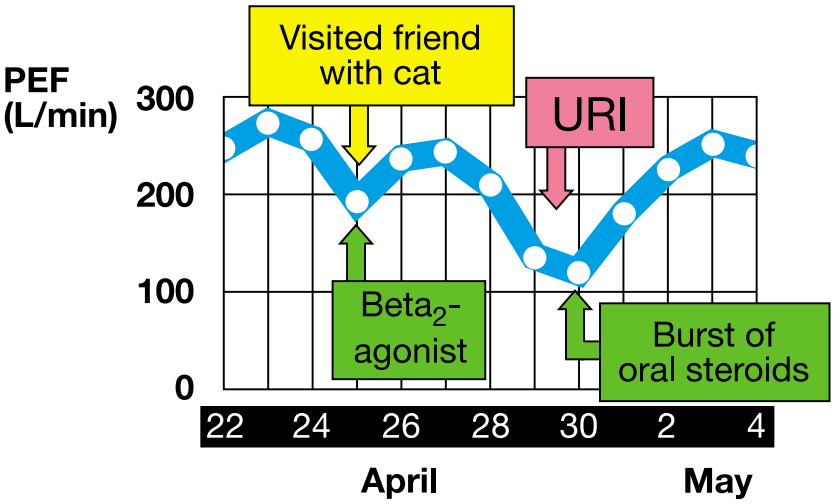
< 50%

Red Zone: Medical alert!

- Use a short-acting inhaled $beta_2$-agonist.
- Call doctor or emergency department, or go to emergency department.

Asthma changes over time. Patient monitoring and follow-up are important.

Janie Doe: PEF personal best = 280 L/min



At follow-up visits, ask the child and parent about:

1. Symptoms

- Has the child's asthma been better or worse since the last visit?
- In the past 2 weeks, how many days has the child had symptoms:
  - ⇒ During the day?
  - ⇒ At night, which woke him/her up or woke parents?
  - ⇒ Upon waking up in the morning?
  - ⇒ While exercising or playing?
- Since the last visit, how many days has the child missed school or activities due to asthma?

2. Exacerbations

- Since the last visit, has the child had any episodes when asthma symptoms were a lot worse than usual?
  - ⇒ What caused symptoms to worsen?
  - ⇒ What did the child (and/or parent or caregiver) do?
- Has the child had any unscheduled doctor visits, ER visits, or hospital stays since the last visit?

3. Peak Expiratory Flow (PEF) Rates

- What is the highest and lowest PEF measured at home or school since the last visit (or in the last week)?
- Has the child's PEF dropped below 80% of personal best since the last visit (or in the last week)?
- **CHECK THE TECHNIQUE**

Remember the goals of therapy:

- Prevent chronic and troublesome symptoms.
- Prevent exacerbations of symptoms.
  - ⇒ No acute episodes of asthma that require a doctor visit, emergency room visit, or hospital stay.
- Maintain normal activity levels.
- Maintain "normal" pulmonary function.

Accommodate your adolescent patients.

- Encourage, and respond promptly to, their phone calls.
- Offer office visits convenient to their schedules.

4. Medication

- What medications are being used? How often?
- Has any regular medication been missed, stopped, or changed? If so, why?
- How many puffs of short-acting beta$_2$-agonist is the child using daily? weekly?
- How much short-acting beta$_2$-agonist is the child using for exercise?
- Is the child using a metered-dose inhaler (MDI) with a space/holding chamber, a dry powder inhaler (DPI), or a nebulizer?

  ⇒ **CHECK THE TECHNIQUE AT EVERY VISIT**
- Does the asthma medication have any other effects on the child (e.g., cough, upset stomach, bad taste, shakiness)?
- Periodically check the child's/family's techniques for:

  ⇒ Cleaning medication devices

  ⇒ Counting doses

  ⇒ Replacing nebulizer and spacers/holding chambers

5. Following the Care Plan

- What questions do you have?
- Is the plan useful?
- Have there been any problems following the daily management plan or the action plan?

Always review after-hours phone numbers and steps for emergency care.

Tips for Working Within the Time Constraints of the Typical Office Visit

- Give patients an assessment questionnaire to complete in the waiting room.
- Have patients come back to the office more frequently, especially at the beginning of treatment and after an exacerbation.
- Break the assessment and education needs into several components during these visits. Some could be completed at home in between visits.
- Train nurses or other office staff to teach MDI and spacer/holding chamber techniques, teach use of the peak flow meter, answer questions, and provide information.
- Use videos and educational materials from outside sources.

Referral to an asthma specialist (for consultation or co-management) is recommended when:

- The child has had a life-threatening asthma exacerbation.
- Goals of asthma therapy are not being met after 3-6 months of treatment; earlier if the child appears unresponsive to treatment.
- Signs and symptoms are atypical, or there are problems in differential diagnosis.
- Other conditions complicate asthma or its diagnosis (e.g., untreated sinusitis, rhinitis).
- Additional diagnostic testing is indicated (e.g., pulmonary function testing, allergy skin testing).
- The child or family needs additional education and guidance on complications of therapy, problems with adherence, or avoidance of triggers.
- The child is being considered for immunotherapy.
- The child has severe persistent asthma.
- The child is under 3 years of age and has moderate or severe persistent asthma.
- The child has used long-term oral corticosteroid therapy, high-dose inhaled corticosteroid therapy, or more than 2 bursts of oral corticosteroids in 12 months.

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